PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH COLUMBIA

Wildlife Distribution and Habitat Use South of the Peace Reach of Williston Reservoir, February 1991

R. J. Backmeyer
March 1991

PWFWCP Report No. 7

105-00906/

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

Peace/Williston Fish and Wildlife Compensation Program, 1011 Fourth Ave. 3rd Floor, Prince George B.C. V2L 3H9

Website: *www.bchydro.bc.ca/environment/initiatives/pwcp/*

This report has been approved by the Peace/Williston Fish and Wildlife Compensation Program Fish Technical Committee.

Citation: R. J. Backmeyer. March 1991. Wildlife distribution and habitat use south of the Peace Reach of Williston Reservoir. February 1991. Peace/Williston Fish and Wildlife Compensation Program, Report No. 7 19pp plus appendices.

Author(s): Rod J. Backmeyer[1]
Address(es): [1] BC Environment, Fort St. John, BC

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1. Introduction

This report documents the results of a reconnaissance wildlife inventory and snow depth survey undertaken in February, 1991, in selected uplands and drainages south of the Peace Reach of Williston Lake. The survey was essentially a continuation of similar surveys carried out by David Hatler on the terrain adjacent to the Parsnip and Finlay Reaches in 1989 and 1990, respectively. These surveys are preliminary management activities supported by the Williston Compensation Agreement, which seeks to restore some of the wildlife habitat lost due to the creation of the Williston Reservoir.

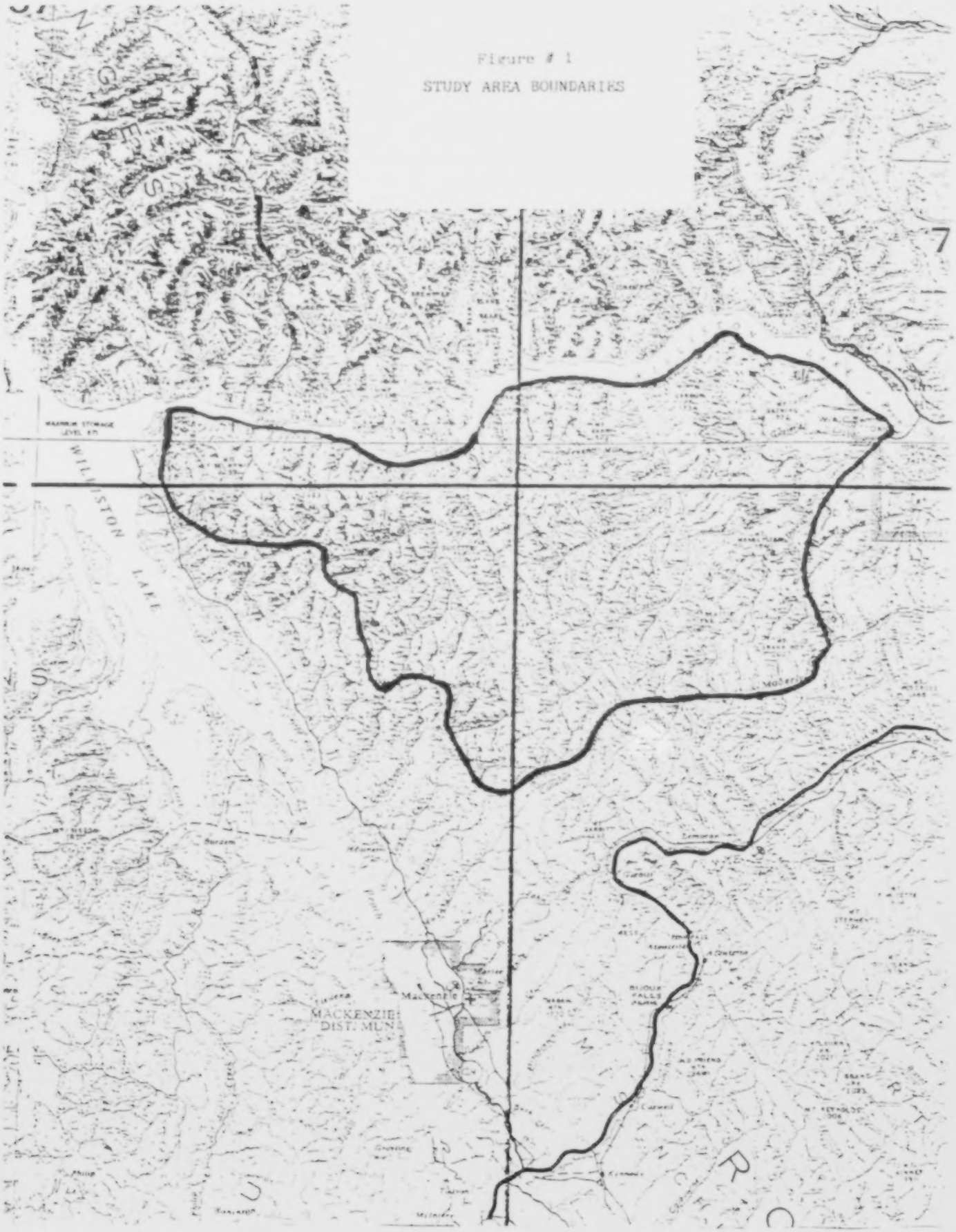
2. Study Area and Objectives

The study area for this project, as delineated by the B.C. Ministry of Environment (M.O.E.), consists of most of management unit (M.U.) 7-31 and the Selwyn Creek and Collin Creek drainages of M.U. 7-30 (Fig.1).

The primary objective for the project was to conduct a reconnaissance wildlife inventory and snow depth survey with the intention of identifying potential habitat enhancement opportunities, and to provide information on ungulate winter distribution and habitat use. This was a multi-species inventory, therefore all potential ungulate winter range was surveyed with specific emphasis on areas of known or suspected winter use as identified by M.O.E. staff and records.

Fieure # 1

STUDY AREA BOUNDARIES



Moose was the focal species in low elevation habitats and along drainages. Caribou, mountain goat and Stone's sheep were the focal species in upland and alpine habitats.

3. Methods and Conditions

3.1 Survey Characteristics

The data gathering was accomplished by 21.7 hours of aerial survey, in a Bell 206B helicopter, during the period of February 23-25, 1991. The project was a reconnaissance inventory designed to provide a complete overview of the study area and was not intended to supply statistically reliable population estimates. General areas were preselected for coverage based on logistical factors such as available fuel and weather conditions, however the specific flight line was determined while the survey was in progress. Traditional winter habitats, riparian shrubland, old burns, old cut blocks, deciduous and mixed wood forests, south aspects and windswept alpine were emphasized. The large expanses of mid-elevation conifer forest were sampled to a lesser degree due to poor sightability and high snow depths. Lowland habitats were inventoried by following various drainages whereas alpine sites were covered by flying contours around mountain blocks. Flight speed during the inventory averaged between 80 and 100 km/hr and altitude above ground level varied from 50 to 150 meters depending on terrain and wind conditions.

3.2 Navigation, Mapping and Recording

Navigation was done from the front, left seat of the helicopter and two spotters were used in the rear seats. The maps used for navigation were 1:50,000 air photo mosaics (93-O/9;10;15;16; 94-B/1;2;3;4) and 1:50,000 National Topographic Series maps (93-O/11;13;14). Flight lines, animal sightings, track densities and occasional notes were recorded directly on the maps. Each animal or group of animals sighted was given a group number on the maps and one "of the spotters recorded the species and number of animals in the group on a separate tally sheet.

3.3 Survey Conditions

The major factor affecting the survey was climatic conditions, both current and long-term. The inventory was carried out during a period of moderate chinook conditions. Winds were from the southwest, moderate in strength, and gusty. Daily maximum temperatures in the study area ranged from +3 to +10 degrees Celsius. Wind conditions, alone, did not generally have an adverse effect on the survey results, with the exception of the south and east slopes of The Monach, where strong downdrafts precluded any intensive search effort. The combination of winds and warm temperatures did affect track identification and made it difficult to evaluate the extent of ungulate use in some areas.

With regard to long-term climatic conditions, the

available information suggests unusual conditions from November 1990 through February 1991. The statistics quoted in the following description of winter conditions are from the Fort St. John airport weather records. Although this information cannot be directly correlated to specific conditions in the study area, it does provide an overview of general winter conditions.

Winter conditions were normal until late November 1990. On November 20 the weather turned cold, with (average daily highs approximately -20 C), until December 4. Snow accumulation increased from 11 cm on November 1 to 37 cm by November 30. There was a mild chinook from December 4-8, turning cold again by December 10, with average daily highs of -12 C and lows of -24 C until December 31. Snow accumulation reached 55 cm by December 31. January continued cold until the 11th, with temperatures averaging -22 C for highs and -32 C (lows). Snow depths remained stable at approximately 55 cm.

On January 12 the weather turned warm and remained unusually warm throughout February. Average highs for this period were +1 C, with a range of -20 C to +5 C. Snow depths dropped from 55 Cm on January 11 to 44 cm by January 31, and down to 17 cm by February 28.

In summary, the winter started out unusually cold with high snowfall and turned unusually warm in January and remained warm. These conditions gave several sites within the study area the appearance of good winter habitat,

particularly south aspects and windswept alpine areas. Snow depths taken on adjacent protected sites showed high accumulations and many of apparent winter ranges would be of marginal value in a normal or severe winter.

4. Results and Discussion

The focus of this survey was to provide descriptive information on animal distribution, winter habitat selection, and snow depths within the study area. The information gathered was not intended for ungulate population analysis, therefore no age or sex classifications were done on any animals seen. Table 1 summarizes species composition and group size data for the fifty-one observations of ungulates in this survey. Figure 2 shows all flight lines and the locations of all ungulates recorded.

Table 1. Characteristics of Ungulate Observations.

Species	Groups		Animals		Mean Group Size
	#	%	#	%	
caribou	21	41.2	182	71.9	8.7
moose	16	31.4	30	11.9	1.9
mtn. goat	12	23.5	30	11.9	2.5
Stone's sheep	2	3.9	11	4.3	5.5
Totals	51	100	253	100	-

4.1 Snow depths

A total of eighteen snow depths were recorded during the

survey. Eight were measured using a 2.5 meter measuring rod, and ten were by visual estimate at sites with low snow accumulations. There were no attempts to measure snow depths in alpine areas due to the windswept nature of these habitats. The snow depth information has been divided into three categories, based on the major drainages in the study area. The three units are: the east slope of the Rocky Mountain foothills, the Carbon Creek watershed, and the Clearwater Creek watershed. Table 2 summarizes the snow depth data and Figure 3 shows the location of each site.

The unusual winter conditions described in Section 3.3 make it difficult to analyze snow depth information. Some sites, such as the lower slopes on the west side of Indian Head and Pardonet Hill were virtually snow free at the time of the survey. Although they appeared to provide ideal winter habitat, there were no ungulates found on or near these sites. The lack of animals indicates that these areas do not provide adequate winter range under normal or severe winter conditions. The east slope of the foothills had generally low snow accumulations as would be expected. This general area appears to have the best potential for moose and deer winter range. The extensive timber harvesting that has occurred in this area should result in an abundance of available browse, providing these cut blocks are not treated with herbicide.

The Carbon Creek drainage has very little potential for

Table 2. Snow depth survey results.

Location	Elevation	Aspect	Habitat	Snow Depth	
East Slope					
1. Dowling Crk.	825m	NW	cutblock	<15cm	(VE)
2. Stott Crk.	900m	SE	cutblock	<20cm	(VE)
3. Gething Crk.	915m	N	cutblock	<20cm	(VE)
4. Elizabeth Crk.	1050m	NE	cutblock	30cm	(MS)
5. Dowling Crk.	1220m	Flat	cutblock	150cm	(MS)
6. Moberly R.	1220m	SW	burnt ridge	<10cm	(VE)
Carbon Creek					
7. Pardonet Hill	750m	W	steep decid.	0	(VE)
8. Indian Head	750m	W	steep decid.	0	(VE)
9. McAllister Crk.	825m	Flat	cutblock	<20cm	(VE)
10. Seven Mile Crk.	915m	S	steep conifer	<20cm	(VE)
11. Eleven Mile Crk.	915m	E	cutblock	90cm	(MS)
12. Upper Carbon Crk.	975m	Flat	meadow	250cm	(MS)
Clearwater Creek					
13. Clearwater Inlet	750m	W	steep burn	0	(VE)
14. Clearwater Inlet	750m	NE	cutblock	130cm	(MS)
15. Clearwater Creek	750m	Flat	cutblock	<20cm	(VE)
16. Ducette Creek	825m	Flat	meadow	100cm	(MS)
17. Clearwater Creek	915m	Flat	meadow	220cm	(MS)
18. Clearwater Lake	915m	Flat	old burn	170cm	(MS)

VE - visual estimate
MS - measured site

low elevation winter range with the possible exception of the Indian Head area. However, this site should be examined under normal and severe winter conditions before any enhancement projects are undertaken. The Pardonet Hill area should be examined under these conditions, also.

The Clearwater Creek drainage has some potential for low elevation winter range at the mouth of Ducette Creek. The old burn along the south and west aspects is currently receiving moderate moose use. This site should also be re-examined to further evaluate it's enhancement potential.

Snow conditions in the alpine areas were probably affected by the extended period of warm weather prior to this survey. At the time of the survey virtually all of the alpine habitat east of Carbon Creek, including: Beattie Peaks, Mount Montieth, Mount Frank Roy, Mount McAllister, Battleship Mountain, Carbon Peak and Mount Gething, were windswept with snow depths less than 10 cm, except in sheltered locations where drifting had occurred.

The alpine areas between Carbon Creek and Clearwater Creek had greater snow accumulations than those east of Carbon Creek. The more exposed ridges and areas with significant southerly aspects were basically snow-free, however these sites were relatively small and were surrounded by alpine and/or subalpine habitat, with high snow accumulation and heavy drifting.

The alpine habitat west of Clearwater Creek, including the Mount Selwyn area, had virtually no snow-free areas, with

the exception of some very steep southerly aspects and the eastern end of some of the ridges extending close to Clearwater Creek.

4.2 Caribou

A total of 182 caribou were seen in twenty-one separate groups during the survey. In addition, five locations were noted in which fresh caribou tracks were found, but no animals observed due to the use of heavily forested habitat. "Table 3 give* a breakdown of the habitat selection for all caribou and caribou track sightings. Figure 4 indicates the location of each site.

Caribou distribution in the study area appears to be related to snow depths and the availability of terrestrial lichen. The windswept alpine areas east of Carbon Creek were used to the greatest extent, with 149 caribou found in this area (82% of total caribou observed.) The animals found on these sites were using the alpine areas almost exclusively, with little use of the adjacent subalpine forests. Caribou use drops drastically as snow depths increase west of Carbon Creek. Only four small groups, totalling 14 animals (8%), were found between Carbon Creek and Clearwater Creek. Of these four groups, three were using isolated patches of windswept terrain just west of Carbon Creek, while the other group was using subalpine forests further west.

Nineteen caribou (10%) were found in four different locations in the deep snow belt west of Clearwater Creek. Five additional locations with fresh caribou sign were

Table 3. Caribou Habitat Selection.

*Map No.	Location	Animals (No.)	Elevation (m)	Habitat Use Primary	Secondary
1	Mt. Montieth	4	1675	alpine	
2	Mt. Frank Roy	26	1675	alpine	=
3	Mt. Frank Roy	14	1675	alpine	-
4	Mt. McAllister	7	1825	alpine	-
5	Mt. McAllister	17	1825	alpine	-
6	Mt. McAllister	5	1375	SAF	alpine
7	Mt. McAllister	11	1675	alpine	
8	Mt. Gething	5	1500	alpine	-
9	Mt. Gething	28	1650	alpine	-
10	Carbon Peak	1	1500	alpine	-
11	Beattie Peaks	21	1525	alpine	SAF
12	Beattie Peaks	4	1675	alpine	
13	Beattie Peaks	6	1825	alpine	-
14	Mt. Wrigley	4	1675	alpine	-
15	The Monach	5	1675	alpine	=
16	The Monach	2	1675	alpine	
17	Headwaters- Eleven Mile Crk.	T	1525	SAF	-
18	Macoun Crk.	12	1375	alpine	SAF
19	Macoun Crk.	H.T.	1375	SAF	
20	Macoun Crk.	L.T.	1525	SAF	-
21	Point Crk.	4	1525	alpine	SAF
22	Point Crk.	2	1675	alpine	SAF
23	Point Crk.	H.T.	1375	SAF	-
24	Point Crk.	M.T.	1375	SAF	-
25	Selwyn Crk.	1	1350	SAF	alpine
26	Selwyn Crk.	H.T.	1525	SAF	alpine

* Refer to Figure 4
H.T. - heavy tracks
M.T. - moderate tracks
L.T. - light tracks
SAF - subalpine forest

recorded, however no animals were located at these sites due to heavy conifer cover. All caribou and fresh track sites were associated with subalpine forest habitats. There was some sign of cratering in alpine areas, but the majority of activity was in the forested habitat.

Habitat selection in that portion of the study area west of Carbon Creek is indicative of aboreal lichen feeders. There is no firm data to support this assumption, therefore further research is required as there is a potential for forestry/caribou conflicts in this area in the future.

4.3 Moose

A total of thirty moose were recorded in sixteen locations during the survey. Table 4 gives a breakdown of habitat selection and Figure 5 indicates the location of each sighting.

The only area of significant moose activity in the entire study area is the low elevation habitat, below 950 meters, along Gaylard Creek, the lower reaches of Gething and Dowling Creeks, and the lower slopes along Williston Lake as far west as Table Creek (Figure 5). This area is comprised of mixed-wood forests and a relatively high percentage or recently harvested cutblocks. Snow depths were generally less than 30 cm – not deep enough to restrict moose movements. Tracks were evident throughout the area, although only eight moose were seen. The lack of sightings may be the result of moose seeking heavy cover during the warm, sunny weather.

Table 4. Moose Habitat Selection,

*Map No.	Location	Animals (No.)	Elevation (m)	Habitat
1	Moberly River	2	765	riparian
2	Gething Crk.	2	700	cutblock
3	Gething Crk.	2	915	cutblock
4	Gething Crk.	1	915	cutblock
5	Gaylard Crk.	3	750	cutblock
6	Gaylard Crk.	1	750	cutblock
7	Stott Crk.	1	1200	CF
8	Carbon Crk.	2	825	riparian
9	Clearwater Lake	1	915	burn
10	Clearwater Lake	2	915	burn
11	Clearwater Lake	1	915	burn
12	Clearwater Lake	1	915	burn
13	Clearwater Crk.	2	765	riparian
14	Clearwater Inlet	4	765	burn
15	Clearwater Inlet	2	765	burn
16	Ducette Creek	3	765	burn

* Refer to Figure 5
CF - conifer forest

(The use of heavy cover was recorded during the relocation of radio-collared moose in the Site C wildlife impact study during the same time period.)

Moose use of cutblocks in this area is evident in Table 4. This use may increase in the future as many of the cutblocks are too recent to provide available browse and even fewer are regenerated to the point where they provide visual cover. Extensive use of herbicides could seriously impact the future value of this area as moosa winter range.

The remainder of the study area had very little moose activity. Carbon Creek had very light moose use along the riparian areas, however snow depths are generally restrictive in this watershed. Again, there are a lot of recent cutblocks but regeneration has not reached a point where significant browse is available. Some of the cutblocks with south and west aspects may provide some winter habitat, but snow depths will always be a concern, making these sites marginal, at best.

The five moose found near Clearwater Lake were all "yarded up." The snow depth in this area was 170 cm. All moose were in restricted areas of heavy use and when driven off their paths would flounder in deep snow. Although this burn is probably ideal summer range it is not winter habitat. Any animals wintering in this burn area are in serious danger of starvation, as well as being highly susceptible to predators.

The moose found on the east side of Clearwater Inlet are

on an old burn that currently provides good browse, but snow depths may be excessive during a normal winter. Snow depth was minimal at the time of the survey. The unusual stretch of warm weather prior to our flights may have significantly reduced the mid-winter snow accumulations. Although this site may only be marginal winter range it does warrant further investigation in a normal to severe winter.

4.4 Mountain Goats

A total of thirty mountain goats were recorded in twelve locations during the survey. Table 5 summarizes habitat selection and Figure 6 indicates group locations.

The majority of mountain goats located during the survey were found between Carbon Creek and Clearwater Creek; twenty-eight of the thirty goats observed. All goats found in this block were at or slightly above timber line and adjacent to escape terrain. The two remaining goats were found on steep alpine ridges, with south aspects, west of Clearwater Creek.

There appears to be an abundance of unused winter habitat available for mountain goats in the study area. The area west of Clearwater Creek from Macoun Creek north to Williston Lake has extensive areas of steep south aspects with low snow accumulations and timbered bluffs similar to those areas being used to the east. There also appears to be suitable unused habitat in the Mount McAllister, Beattie Peaks, and Mount Montieth areas. Further inventories are required to determine the extent of the mountain goat population and to evaluate the potential for habitat

Table 5. Mountain Goat Habitat Selection.

*Map No.	Location	Animals (No.)	Elevation (m)	Habitat
1	Mt. Cowper	1	1525	A.R.
2	The Monach	8	1525	T.R.
3	The Monach	1	1525	T.R.
4	Pardonet Crk.	6	1525	A.R.
5	Pardonet Crk.	2	1500	T.B.
6.	Ducette Ridge	1	1525	A.R.
7	Ducette Ridge	1	1525	A.R.
8	Ducette Ridge	3	1500	T.B.
9	Ducette Peak	1	1525	A.R.
10	Ducette Peak	4	1500	T.B.
11	Clearwater Crk.	1	1825	A.R.
12	Mt. Crysdale	1	1825	A.R.

* Refer to Figure 6
A.R. - alpine ridge
T.R. - timberline ridge
T.B. - timberline bluffs

enhancement and/or transplant potential.

4.5 Stone's Sheep

Stone's sheep were found at two locations only, seven on Mount Selwyn and four on Mount Montieth. The sheep on Mount Montieth were part of the 1990 transplant to Mount Frank Roy; one radio-collared ram and three unclassified animals.

The seven sheep located on Mount Selwyn were all on an exposed alpine ridge. The area was partially windswept, but appeared to be marginal winter range. There does not appear to be any potential for habitat enhancement in this area.

Mount McAllister has good potential to support Stone's sheep and may become inhabited through natural dispersal from the Mount Montieth transplant. However, if this does not occur in the near future a further transplant to this mountain should be considered.

4.6 Other Mammals

Snow conditions were not conducive for track identification from smaller mammals. No wolves were seen, however wolf tracks were recorded in three locations:

lower Carbon Creek	-	5-6 tracks in valley bottom
Pardonet Creek	-	3-5 tracks in upland meadows
Mount Crysdale		2 tracks on alpine ridges

Wolverine tracks were fairly common throughout the study area, but not abundant in any specific location. No tracks from smaller furbearers were evident due to snow conditions.

5. Habitat Considerations and Recommendations

With the exception of moose, all ungulates observed during this survey were subsisting in high elevation "natural" habitats. The potential for enhancement of these areas is limited, therefore the primary management concern should be the maintenance and protection of these key sites. Forest harvesting is underway in all major drainages within the survey area. Although the low elevation timber is the first to be removed, with access in place, higher elevation blocks will soon be under consideration. The potential for wildlife/forestry conflicts exists under two situations. The first is harvesting versus mountain goat winter range. Although it is unlikely that the actual timbered bluffs selected by mountain goats in the study area will be logged, due to the steepness of the terrain and poor quality of timber, any harvesting immediately adjacent to these areas may adversely affect the goats involved. Further inventory is required to identify the existing and potential mountain goat winter ranges in order to facilitate their protection in the future.

Second is the apparent use of aboreal lichens by caribou wintering west of Clearwater Creek. The caribou/forestry conflict has been going on throughout the province for several years. Further research is required to identify the feeding habits of those caribou found west of Clearwater Creek in order to determine the possibility of a caribou/forestry conflict in this area as well.

Moose within the study area were generally found to be wintering on low elevation, early successional sites, primarily cutblocks and old burns. Moose populations in the survey area will be highly dependent on future forestry practises. Extensive forest harvesting has been completed recently in all of the potential moose winter ranges in this area. The creation pf large areas of early successional habitat will be of great benefit to moose population, providing there are no extensive herbicide programs to remove the newly created browse. Integrated management with the forest industry is essential to the enhancement of moose winter range in general.

There are three isolated areas of "natural" habitat where enhancement opportunities may exist: Indian Head, Pardonet Hill, and Clearwater Inlet. Each of these sites have significant low elevation, southwest aspects that may provide adequate winter range. Ground evaluation of each of these sites is required to determine their true potential.

In closing, it is apparent that wildlife habitat management within the survey area will be on the upland habitats that remain rather than on the traditional lowland sites that are now flooded. Given the importance of these upland habitats to the forest industry it is essential that forestry/wildlife interactions be fully understood in order to minimize the negative impacts and maximize the potential enhancement of wildlife habitats through timber harvesting. Further research is required to identify the forestry/

wildlife considerations in this area.

Figure # 2
FLIGHT LINES &
UNGULATE SIGHTINGS
1:250,000
LEGEND
C - CARIBOU
G - MOUNTAIN GOAT
M - MOOSE
S - STONE'S SHEEP
H A R T
ROCKY
FOOTHILLS
WABISTON

Figure # 3
SNOW DEPTH SURVEY
1:250,000
7 - NO SNOW
6 - NO SNOW
2 - < 20 cm
4 - 30 cm
10 - < 20 cm
13 - NO SNOW
3 - < 20 cm
1 - < 15 cm
14 - 130 cm
11 - 90 cm
16 - 100 cm
15 - < 20 cm
9 - < 20 cm
5 - 150 cm
17 - 220 cm
6 - 410 cm
12 - 250 cm
18 - 170 cm
ROCKY MOUNTAIN FOOTHILLS
MONTANE
HART
RANGE

LEGEND
(5) - 5 CARIBOU
HT - HEAVY TRACKS
MT - MODERATE TRACKS
LT - LIGHT TRACKS
Figure # 4
CARIBOU LOCATIONS
1:250,000
ROCKY MOUNTAIN FOOTHILLS
ROCKY MOUNTAINS
MISINCHINKA RANGES
HART
HT
MT
LT

Figure # 5
MOOSE LOCATIONS
1:250,000
LEGEND
(2) - 2 MOOSE
MT - MODERATE TRACKS
LT - LIGHT TRACKS
MISSION RANGE
MONTANE
ROCKY
MOUNTAINS
FOOTHILLS
H A R T
MOUNTAIN

Figure # 6
MOUNTAIN GOAT LOCATIONS
1:250,000
(3) - 3 GOATS
ROCKY MOUNTAIN FOOTHILLS
HART
MISSINCHINKA
ROCKY MOUNTAINS
WILLISTON